IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Bohler et al.

Confirmation No. 9930

Application No.: 10/555,721

Examiner: Mary E. Zetti

Filed: April 2, 2007

Docket No.: GLOZ 200154US02

Title: LEAD-BASED LIGHT BULB

BRIEF ON APPEAL

Appeal from Group 2875

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CERTIFICATE OF TRANSMISSION

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January 4, 2011
Date

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal and the present application is GELCore, LLC, by way of an Assignment recorded in the U.S. Patent and Trademark Office.

II. RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellant, Appellant's representative, or the Assignee, that may be related to, or which will directly affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1, 3, 5, 7, 11-18, 20-21, and 23-30 are on appeal.

Claims 1, 3, 5, 7, 11-18, 20-21, and 23-30 are pending.

Claims 1, 3, 5, 7, 11-18, 20-21, and 23-30 are rejected.

Claims 2, 4, 6, 8-10, 19, and 22 are canceled.

IV. STATUS OF AMENDMENTS

An Amendment After Final Rejection was filed on October 4, 2010. By an Advisory Action dated December 15, 2010, it was indicated that the requested amendments had been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention of claim 1 is directed to a light source comprising a light engine 16 ([0019, Figs. 1, 2) for generating light of one of a plurality of wavelengths. The light engine 16 ([0019], Figs. 1, 2) includes a platform 14 ([0018], Figs. 1, 2) and at least one LED 12 ([0017], Figs. 1, 2) disposed on the platform 14 ([0018], Figs. 1, 2), an enclosure 22 ([0017], Figs. 1, 2) surrounding a light generating area of the light engine 16, a base 24 ([0019], Figs. 1, 2) including a heat sink 26 ([0019], Figs. 1, 2) for conducting thermal energy away from the at least one LED 12, into which the heat sink 26 and the light engine 16 is mounted, and a luminescent converting element ([0025]) to receive a light generated by the light engine and convert at least a portion of the received light into visible light. The luminescent converting element ([0025]) either disposed on the enclosure, dispersed within the material forming the enclosure, or both. The light source further includes a conversion circuit 30 ([0021], Figs. 1, 2) for supplying electric power to the light engine 16.

The invention of claim 5 is directed to the light source of claim 1, including a light guide 36 disposed within the enclosure 22 ([0028]).

The invention of claim 15 is directed to the light source of claim 1, wherein the heat sink 26 comprises a slug 32 inserted into the base 24 for conducting the thermal energy from the at least one LED 12 to at least one of the base 24 and ambient air ([0022]).

The invention of claim 17 is directed to the light source as set forth in claim 1, wherein the heat sink 26 extends radially from the base 24 to conduct the thermal energy to ambient air ([0022]).

The invention of claim 23 is directed to a modular adaptable LED lighting system 10 ([0017, Figs. 1, 2). The lighting system 10 comprises a base module 24 ([0019], Figs. 1, 2) and at least two light modules having different light emission characteristics, each light module including a platform 14 ([0018], Figs. 1, 2) which mates with the base module 24, and at least one LED 12 ([0017], Figs. 1, 2) disposed on the platform 14 for generating light in a range from ultraviolet to infrared wavelengths. The lighting system 10 further includes an enclosure 22 ([0017], Figs. 1, 2), which surrounds the light produced by the light module such that at least a portion of the light is transmitted through the enclosure 22, a wavelength converting material ([0025]) being one of

disposed on the enclosure 22 and dispersed within the material forming the enclosure 22 or both, an index matching material 28 ([0020]) encompassing the at least one LED 12, and a power module 30 ([0021]) for energizing the at least one LED 12.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are presented for review:

Claims 1, 14, 20, 21, and 28-30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,586,822 to Harbers (hereinafter "Harbers") in view of U.S. Patent Application Pub. No. US2003/0076051 A1 to Bowman et al. (hereinafter "Bowman") and in further view of U.S. Patent No. 6,234,648 to Borner et al. (hereinafter "Borner").

Claims 3, 5, 7, and 9-13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Harbers and Bowman and further in view of Borner and U.S. Patent No. 5,758,951 A to Haitz (hereinafter "Haitz").

Claims 15-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Harbers and Bowman and further in view of Borner and U.S. Patent Application Pub. No. US2003//1056416 A1 to Stopa (hereinafter "Stopa").

Claim 18 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Harbers and Bowman and further in view of Borner and U.S. Patent Application Pub. No. US2004/0105262 A1 to Tseng et al. (hereinafter "Tseng").

Claims 23-25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Harbers in view of Borner and further in view of U.S. Patent No. 5,49,646 to Brittell (hereinafter "Brittell").

Claims 26 and 27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Harbers in view of Borner and further in view of Brittell and U.S. Patent No.6,746,885 to Cao (hereinafter "Cao").

VII. ARGUMENT

A. Claims 1, 2, 14, 20, 21, and 28-30 are Non-Obvious Over Harbers in view of Bowman in Further view of Borner

Independent claim 1 is directed to a light source comprising a light engine for generating light of one of a plurality of wavelengths. The light engine includes a platform and at least one LED disposed on the platform, an enclosure surrounding a light generating area of the light engine, a base including a heat sink for conducting thermal energy away from the at least one LED, into which the heat sink and the light engine is mounted, and a luminescent converting element to receive a light generated by the light engine and convert at least a portion of the received light into visible light. The luminescent converting element is one of disposed on the enclosure and dispersed within the material forming the enclosure or both. The light source further includes a conversion circuit for supplying electric power to the light engine. It is respectfully submitted that Harbers, Bowman, and Borner do not, individually or in combination, teach or suggest each limitation as recited in the subject claims.

In the final Office Action, the Examiner submits that Harbers teaches the claimed light source, but fails to teach the claimed conversion circuits for supplying electric power to the engine or the luminescent converting element being disposed on the enclosure and dispersed within the material forming the enclosure, or both. The Examiner therefore cites Bowman as teaching an LED module including a conversion circuit and Borner as teaching an LED lighting system comprising at least one LED disposed on a platform and a wavelength converting material being disposed one of on or within the material forming the enclosure. According to the Examiner, at the time the invention was made, it would have been obvious to one or ordinary skill in the art to have modified the invention of Harbers and Bowman by providing a wavelength converting material on or within the material of the enclosure as taught by Borner for the purpose of creating an aesthetically pleasing light out. This contention is without merit.

The proposed combination of Harbers and Borner is inappropriate. As illustrated below (below left), Harbers is directed to a lighting system that resembles a filament lamp, including a body 1 in the form of a spirally wound wire that is coated with a conversion means 3, which may be a phosphor. The lighting system further comprises a light transmitting envelope 5 with a reflective coating 6, to reflect light that is not converted by the conversion means.

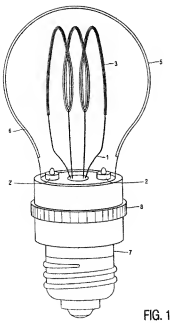


FIG. 1

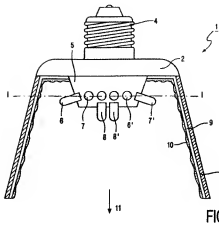


FIG. 1A

In contrast, Borner (above right) discloses a lighting system with at least two LEDs, a screen 3 with a reflecting means 9, and a conversion means 10 for converting a portion of the light emitted by a blue LED into green light. Borner desires to mix blue, red, and green light within the screen and emit white light in direction 11 (Figure 1). It would be illogical to combine the teachings of Harbers and Borner. Particularly, Harbers explicitly teaches that a conversion means is provided on the wire body for converting blue light to visible light in a higher wavelength range, such as green light, to be used as a look-alike of a carbon filament lamp. (See col. 4, lines 63-67-col. 5, lines 1-7). Therefore, the green light emitting conversion means of Borner would have absolutely no function if combined with the lighting system of Harbers, since Harbers already teaches a conversion means and the conversion means would not further the goal of providing a look-alike carbon filament lamp. Moreover, since Harbers is directed to illuminating a phosphor coated filament to provide the appearance of a filament lamp, it would 1) be illogical to modify Harbers by removing the filament element by alternatively coating the envelope 5 with a luminescent converting element rather than a reflective coating 6, and 2) it would be inefficient and illogical to use LED light in Harbers to excite the conversion means 3 on the filament 1 and then further excite a conversion means on the envelope 5.

In the Advisory Action, the Examiner argues that the Borner reference is not being applied to teach a color conversion means, but rather to teach that a color conversion means can be located on the enclosure or dispersed in the material of the enclosure. However, Appellant

submits that "the mere fact that references can be combined or modified does not render the resultant obvious unless the results would have been predictable to one of ordinary skill in the art." MPEP 2143.01. Therefore, although Appellant does not purport that the inclusion of a conversion means on the enclosure is impossible, Appellant maintains that such a configuration would not have been predictable to one or ordinary skill in the art, since it would reduce the functionality of Harbers' lighting system. Specifically, Harbers includes a reflection means on the enclosure so that any light not converted on the body is maintained within the enclosure until it is converted by the conversion means on the body and emitted as visible light. This configuration ensures that the only illumination is emitted from the conversion means 3 on the body 1, to provide a look-alike of a carbon filament lamp. If, however, a conversion means was also provided on the enclosure, the lighting system would no longer appear as a carbon filament lamp, or at a minimum the appearance would be dulled, because the conversion means on the enclosure would also emit illumination. Furthermore, using the wavelength of light of converted illumination from the filament of Harbers to excite a second conversion means on the envelope is inefficient and illogical. As stated in MPEP 2143.01, "if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention to be modified, then the teachings of the references are not sufficient to render the claims prima facie obvious."

Furthermore, Borner does not even provide an enclosure surrounding a light generating area of the light engine to dispose a conversion material, but rather discloses only a screen that extends to each side of the LEDs. (See Fig. 1A). The screen does not surround the light generating area, but rather is configured to direct light in a direction 11, which is not enclosed by the screen. For this reason, Borner provides a fully reflective layer, substantially 100% reflective for visible light to ensure the light only escapes in direction 11. (col. 5, lines 19-22). In short, there is not even a suggestion in either Harbers or Borner to coat an enclosing envelope with a phosphor material that receives all the light and excited by radiation generated by LEDs mounted on a platform and residing on a heat sink. Accordingly, since neither disclosure teaches the proposed configuration, even the illogical and unsupported combination prepared by the Examiner, fails to suggest all claimed limitations of the present application.

Moreover, if Harbers is combined with Borner, as suggested by the Examiner, the lighting system produced would also necessarily include the reflection means of Borner, also

disposed on the screen. Accordingly, modified Harbers in view of Borner would create a lighting system with a body that emits visible light and an envelope covering the body that includes a conversion means and a reflection means that reflects at least substantially 100% for visible light. There is no basis for the Examiner to pick and choose from Borner only those aspects of the disclosure which support his proposed configuration. Appellant respectfully submits that the real combination of features suggested by the combined references is useless, particularly since such a configuration would not be functional with the visible light emitted by the body reflected by the reflection means. In the Advisory Action, the Examiner argues that the Borner reference was only used to teach the possibility of changing the location of the color conversion means to the envelope. However, Appellant submits that there is no suggestion to take only the conversion layer of Borner, leaving behind the substantially 100% visible light reflective coating, and place that conversion layer on the envelope of Harbers where no conversion material is present; particularly, since Harbers already provides a conversion material on the lamp filament.

That the proposed combination picks and chooses specific features from Borner essentially uses Appellants application as a "road map" for selecting and combining the disclosures of the prior art. The Federal Circuit has held that "one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to depreciate the claimed invention". *In re* Fritch, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992). In short, it is not permissible to pick and choose only so much of Borner as will support the Examiner's position and ignore the clear teachings that would make such a combination non-functional. Alternatively, and at a minimum, the Examiner is relying on hindsight provided by the present specification to arise at the rejection. As set forth in MPEP 2142, to reach a proper determination under 35 U.S.C. 103(a), "impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art."

Appellant therefore submits that one skilled in the art would have no motivation to combine the teachings of Harbers and Borner as the Examiner submits, since such would fail to provide any benefit or purpose, and in fact would destroy the functionality of Harbers. However, even if such a configuration was functional, providing a conversion means on the envelope of Harbers would in fact take away from the very purpose of Harbers, which is to emit light from the body as a look-alike for filament lamps. As such, Appellant respectfully submits that the proposed combination of Harbers and Borner is improper and cannot support a conclusion of

obviousness.

B. Claims 3, 5, 7, and 9-13 are not non-obvious over Harbers and Bowman and further in view of Borner and Haitz

With specific regard to claim 5, which recites that the light source includes a light guide that provides an appearance of a filament, Haitz is cited as teaching an illuminating source including LEDs and a light guide within an enclosure. The Examiner argues that since Harbers teaches a light bulb with a wire providing an appearance of a filament, it would have been obvious to have modified the invention of Harbers, Bowman, and Borner (discussed above), such that the light guide of Haitz was utilized to produce the desired lighting effect. Appellant respectfully disagrees and asserts that the Examiner appears to once again rely on hindsight as a means for rejecting the present claims. In fact, Appellants maintain that this rejection supports the above conclusion that the asserted references do not contemplate or suggest providing an LED illuminating lamp having an incandescent appearance provided by disposing a light converting element on a bulb enclosure with the LEDs disposed on a light engine oriented to illuminate the bulb envelope.

Specifically, Appellant maintain that the proposed combination is improper, since there is no teaching or suggestion in any of the cited references that would motivate one skilled in the art to replace a filament-like wire coated having a conversion material (as disclosed in Harbers) with the light guide disclosed in Haitz. The Examiner simply reasons that one of ordinary skill would have found it obvious to have utilized a light guide for creating the desired lighting effect. However, Appellant finds this reasoning baseless, since nothing in Haitz teaches or suggests that the light guide is capable of providing a filament-like appearance, or that there would be any benefit to replacing the filament with Haitz's light guide. Specifically, Haitz teaches that the beam shaping optics are provided to destroy the phase coherence and prevent eye damage; however, there is no indication that such a beam shaping optic would provide a filament-like appearance, or any other benefit over the presently claimed wire.

Moreover, Appellant submits that even if one skilled in the art was to replace the presently claimed conversion coated filament-like wire with the light guide, Haitz specifically teaches how the disclosed VCSEL configuration is preferred over the use of phosphors. (Col. 4, lines 32-54). Haitz describes that typical fluorescent lamps generate white light by stimulating a

phosphor layer with UV light, producing predominantly three lines of light. In contrast the VCSEL is described as using six lines of light, which is said to improve color rendering. A controller is used to adjust the color and/or color temperature. In the Advisory Action, the Examiner argues that just as the converting material covered the wire in Harbers, the conversion coating **could** also be used to cover the light guide.(emphasis added). However, based on the explicit teaching of Harbers and Haitz, one skilled in the art would have no motivation to include conversion material with the light guide of Haitz. As stated above, "the mere fact that references can be combined or modified does not render the resultant obvious unless the results would have been predictable to one of ordinary skill in the art." MPEP 2143.01.

Moreover, including the light guide of Haitz would destroy the very functionality of Harbers. The luminescent material-coated wire of Harbers emits visible light that is then emitted by the light transmissive envelope. The light not converted by the luminescent material is reflected back into the device by the reflective coating on the envelope. If, however, the wire was replaced with the light guide of Haitz, no light emitted by the opto-electronic elements would be converted into a wavelength range that can be transmitted by the envelope, and all the light would be reflected back into the lighting system.

Accordingly, Appellant respectfully submits that claims 3, 5, 7, and 9-13 are nonobvious over the references of record.

C. Claims 15-17 are patentable over Harbers and Bowman and further in view of Borner and Stopa

With regard to claim 15, the Examiner sets forth in the Advisory Action that a "base" is a very general term and that the base of a light source can be considered that lower area of the light source and thus mounting on a PC can be considered in the base, i.e. inserted into the lower section. Appellant disagrees and submits that the "base" is to be interpreted as having its plain meaning, which comprises the ordinary and customary meaning given to the term by those of ordinary skill in the art. (MPEP 2111). The plain meaning of a lighting device base is as described in the specification, namely, a socket having a receptacle into which the light engine is plugged in, preferably a commercially available light bulb socket for easy field exchange and retrofitting. Although Appellant acknowledges that Stopa teaches an LED lighting device with a heat sink comprising a slug for conducting energy away from the LED, the heat sink of Stopa

does not include a slug inserted into the base of the light source. Rather, Stopa teaches that the slug is mounted to a PC board, which is then mounted on a heat sink. (See Fig. 4 and paragraph [0042]). There is no teaching or slight suggestion that the slug is to be inserted into the base as is presently claimed.

Further, with reference to claim 17, the Examiner purports that Stopa teaches a plurality of fins. However, claim 17 recites that the heat sink extends radially from the base to conduct the thermal energy to ambient air. Appellant submits that the fins disclosed in Stopa clearly extend in a downward direction to conduct heat down, away from the LEDs. This is not a radial configuration as is presently claimed. In the Advisory Action, the Examiner submits that the outline of the fins would be an obvious design choice; however, Appellant submits that such is not the case, since Stopa clearly intends the heat to dissipate downwardly and the present configuration dissipates radially. The direction of heat can be a very important factor in determining type of fixtures with which the lamp is compatible. Therefore, since the differing configurations include specific mechanical functions, they can be relied upon to patentably distinguish the claimed invention from the prior art. (MPEP 2144.04).

For at least the aforementioned reasons, Appellant respectfully submits that claims 15 and 17 patentably distinguish over the references of record.

D. Claims 23-25 are Non-Obvious Over Harbers in View of Borner and Further in View of Brittell

Independent claim 23 is directed to a modular adaptable LED lighting system comprising a base module and at least two light modules having different light emission characteristics. Each light module includes a platform which mates with the base module, and at least one LED disposed on the platform for generating light in a range from ultraviolet to infrared wavelengths. The lighting system further includes an enclosure, which surrounds the light produced by the light module such that at least a portion of the light is transmitted through the enclosure, a wavelength converting material being one of disposed on the enclosure and dispersed within the material forming the enclosure or both, an index matching material encompassing the at least one LED, and a power module for energizing the at least one LED. The Examiner asserts that Harbers in view of Borner teaches the lighting system described above; however, does not disclose the material being an index matching material. Brittell is therefore cited as teaching an illumination device including

an index matching material, on the grounds that it would have been obvious to one skilled in the art to have ensured that the material encompassing the light sources was an index matching material for the purpose of ensuring efficient light extraction. Appellants respectfully traverse.

Primarily, Appellant re-submits that the combination of Harbers and Borner is improper and refers to the complete explanation to this point in Paragraph A detailed above.

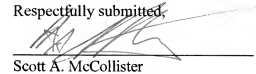
In addition, Appellant submits that, notwithstanding the improper combination, Harbers in view of Borner and further in view of Brittell fails to teach or suggest an LED lighting system including an enclosure, along with an index matching material as asserted by the Examiner. Brittell discloses multiple color producing light bulbs, each bulb including a one piece globe made of plastic or glass. (See col. 8, lines 34-35, as identified by the Examiner). However, Applicant submits that there is absolutely not teaching or suggestion that indicates this globe was in any way coated with an index matching material. In fact, the only mention of a coating is in col. 7, lines 13-14, wherein an opaque cover is coated with a colored light diffusing material. Although glass and plastic may comprise index matching material in themselves, there is no teaching or suggestion that such are used for this purpose and therefore no person skilled in the art would be motivated to take the globes of Brittell to modify the lighting device of Harbers for the purpose of index matching. Additionally, the index matching material presently claimed in provided **in addition to** the enclosure. If Brittell was combined with Harbers, the globe would replace the enclosure, which would result in a different configuration that that presently claimed. Accordingly, Appellant submits the cited references fail to obviate the present claims.

CONCLUSION

For all of the reasons discussed above, it is respectfully submitted that the rejections are in error and that claims 1, 3, 5, 7, 11-18, 20-21, and 23-35 are in condition for allowance. For all of the above reasons, Appellants respectfully request this Honorable Board to reverse the rejections of claims 1, 3, 5, 7, 11-18, 20-21, and 23-35.

Date: January 4, 2011

Respectfully submitted,



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APPENDICES

VIII. CLAIMS APPENDIX:

1. (Previously Presented) A light source comprising:

a light engine for generating light of one of a plurality of wavelengths, the light engine including:

a platform, and

at least one LED disposed on the platform;

an enclosure surrounding a light generating area of the light engine;

a base including a heat sink for conducting thermal energy away from the at least one LED, into which the heat sink and the light engine is mounted;

a luminescent converting element to receive a light generated by the light engine and convert at least a portion of the received light into visible light, said luminescent converting element being one of disposed on the enclosure and dispersed within the material forming the enclosure or both; and

a conversion circuit for supplying electric power to the light engine.

2. (Cancelled)

3. (Previously Presented) The light source as set forth in claim 1, further including:

a light guide disposed within the enclosure.

4. (Cancelled)

5. (Previously Presented) The light source as set forth in claim 3, wherein the light guide provides an appearance of a filament.

6. (Cancelled)

7. (Previously Presented) The light source as set forth in claim 3, wherein the light guide comprises a reflector.

8. (Cancelled)

9. (Cancelled)

10. (Cancelled)

11. (Previously Presented) The light source as set forth in claim 1, wherein the luminescent converting element comprises a phosphor.

12. (Previously Presented) The light source as set forth in claim 1, wherein the phosphor comprises one of:

an organic phosphor,

an organic complex of a rare earth metal,

a nanophosphor, and

a quantum dot phosphor.

13. (Previously Presented) The light source as set forth in claim 1, further comprising:

one of an index matching material and a lensing material encompassing the at least one LED.

14. (Previously Presented) The light source as set forth in claim 1, wherein the base is adapted for mating with the light engine.

15. (Previously Presented) The light source as set forth in claim 1, wherein the heat sink comprises:

a slug inserted into the base for conducting the thermal energy from the at least one LED to at least one of the base and ambient air.

16. (Previously Presented) The light source as set forth in claim 15, wherein the slug comprises:

a plurality of fins disposed about an outer periphery.

17. (Previously Presented) The light source as set forth in claim 1, wherein the heat sink extends radially from the base to conduct the thermal energy to ambient air.

18. (Previously Presented) The light source as set forth in claim 1, wherein the conversion circuit comprises:

an AC to DC converter.

19. (Cancelled)

20. (Previously Presented) The light source as set forth in claim 1, wherein the enclosure comprises a substantially elliptical shape.

21. (Previously Presented) The light source as set forth in claim 20, wherein the enclosure comprises a substantially spherical shape.

22. (Cancelled)

23. (Previously Presented) A modular adaptable LED lighting system comprising:

a base module;

at least two light modules having different light emission characteristics, each light module including:

a platform which mates with the base module, and

at least one LED disposed on the platform for generating light in a range from ultraviolet to infrared wavelengths;

an enclosure, which surrounds the light produced by the light module such that at least a portion of the light is transmitted through the enclosure;

a wavelength converting material being one of disposed on the enclosure and dispersed within the material forming the enclosure or both;

an index matching material encompassing the at least one LED; and

a power module for energizing the at least one LED.

24. (Previously Presented) The lighting system of claim 23 wherein the base module is one of a screw base or a wedge base.

10.

25. (Previously Presented) The light source of claim 1, wherein light of a second wavelength is visible.

26. (Previously Presented) The light source of claim 1, wherein the base further includes an active cooling device.

27. (Previously Presented) The light source of claim 26, wherein the active cooling device is one of thermoelectric cooling, piezo synthetic jets, qu-pipes, heat pipes, piezo fans, and electric fans.

28. (Previously Presented) The light source of claim 1, wherein the platform comprises a printed circuit board or a heat sink.

29. (Previously Presented) The light source of claim 1, wherein the base is a screw or wedge base.

30. (Previously Presented) The light source of claim 1, wherein the light engine is positioned at a peripheral of the enclosure.

IX. EVIDENCE APPENDIX

NONE

X. RELATED PROCEEDINGS APPENDIX

NONE